

ART. III. *On Staphyloraphy*. By JOHN P. METTAUER, M. D., of Prince Edward C. H. Virginia. [With a Plate.]

Cleft palate, whether contemplated as a deformity, or as the cause of much inconvenience to its subjects, presents itself to the humane surgeon as an object demanding his most deliberate and serious attention. Certainly no congenital defect of the human form exceeds the deformity it imparts or elicits more general sympathy for the unhappy victims of it; and as a source of individual inconvenience, few if any are more prolific or disgusting.

Although surgeons early became acquainted with the existence and treatment of congenital division of the lip, a kindred affliction, and not unfrequently complicating it, fissure of the palate, seems to have received very little attention as a proper object of surgery, until within the last twenty-one years.

The honour of having first performed the operation for the correction of this latter deformity, is due to Professor Graefe of Berlin. Near about the same time, (1816,) or perhaps a few years subsequently, Professor Roux of Paris, attracted attention to the same subject, and upon the operation contrived by him was bestowed the appellation of *staphyloraphy*, or *palate-suture*.

In the early history of this operation no one seems to have enjoyed such extended and ample opportunities for cultivating an acquaintance with it, or the infirmity demanding it as a means of relief, as must have fallen to the lot of this last named distinguished operator; and down to the present period it would seem that he may still maintain a decided pre-eminence, if we are to decide from the many cases reported to have been treated by him, amounting to nearly fifty in number. The reputation which Roux enjoys as an operator, and the position occupied by him as a public teacher in the great continental emporium of medical and surgical science, readily enabled him to blazon forth his operations and successes in this new achievement of science and skill, through his lectures and the journals, until a general interest throughout Europe and this country was elicited in regard to it. Soon after Roux's successes were known, other surgeons, both on the continent and in Great Britain, turned their attention to the subject; and the operations of Professors Diellenbach of Berlin, Alcock, Mayo, and others of England; and of our countrymen Drs. Warren, Stevens, Smith, Hosack, and others, succeeding each other in rapid succession; furnish a satisfactory commentary upon the deep interest felt among surgeons to bring the operation before the profession, as a legitimate object of careful attention.

In the United States, Professor Warren of Boston, has generally been regarded as the first who operated for cleft palate, though his claims to precedence, in this respect, seem not to be fully established above those of the late Professor Smith of Yale College, who must have operated very nearly about the same time.

In 1826, the operation was performed by Dr. Stevens of the city of New York; and in September, 1827, by ourselves for the first time.

Dr. Dieffenbach seems to have been more fortunate in the contrivance of means for the easy execution of this operation, than his European brethren; and he really conferred a great benefit by the introduction of the leaden suture, porte, &c., in closing the fissure. His forceps for confining the lips while the margins are pared off, are less commendable, though they may, in his hands, have effected every thing claimed for them by him. In the United States, Drs. Warren and Hosack have made the most important contributions to our stock of instruments, for an account of which, the reader may consult this Journal, Art. I., in the No. for November, 1828; and Dr. A. E. Hosack's Memoir on Staphyloraphy, published in New York in 1833.

The *causes* of congenital cleft palate, have not yet been satisfactorily ascertained. The infirmity may result from power acting upon the fœtus in utero, through the imagination or feelings of the mother; or it may occur associated with certain congenital and hereditary diseases, in the relation of cause and effect. It doubtless is the result of imperfect developement of the part involved in the fissure; or of an arrest of the process by which the organs are unfolded; and as the causes of such an arrest are only conjectural, all is hypothesis, both as to them and the palatine fissure itself.

In considering the means for the correction of cleft palate, we shall contemplate the infirmity under three divisions, each of which will demand a treatment in some respects peculiar; that is: 1st. Division of the uvula only. 2ndly. Division of the uvula and soft palate; and 3dly. Division of the uvula, velum, palatine bones, and of the palatine process of the superior maxillary, in which the division sometimes continues entirely through the alveolar process, laying the floor of the nasal cavity completely open. In this division harelip occasionally occurs as a complicating contingency.

In division of the uvula only, the deformity presents itself in the most simple as well as remediable state. In these cases the uvula may be cleft entirely through its substance, from the apex to the base, or be only partially divided. In either case little inconvenience results, whether in modulating the voice, or in attempts at deglutition. The voice, although rendered somewhat nasal, is not so much disor-

dered as to become disgustingly indistinct; it only assumes such a state when the uvula is divided entirely through its base.

Individuals labouring under this modification of cleft palate are prone in a peculiar degree to catarrhal affections, and inflammations of the fauces, throat, and trachea. The almost constant irritation of the divided and sensitive uvula, kept up by the unequal actions and movements of this organ, will enable us to account for the almost constant disposition to cough, as well as for the various guttural affections so common in these cases. We are inclined to believe that simple divisions of the uvula are much more perturbing of the functions of the mucous membrane of the trachea and bronchi, than when the cleft extends into the velum and soft palate. In this state the uvula is very often enlarged and elongated from congestion or inflammation of its vessels.

When the cleft extends quite through the uvula, and more or less into, or to the base of the soft palate, an example of the second variety of the several modifications of the infirmity is presented. In this, as well as in the preceding, the division is confined to the median line, and separates the parts equally. The cleft is more expanded, and disposed to gape and widen as the individuals increase in stature. Its margins, too, are more or less thin, even and smooth, from the apices of the uvula to the angle in the velum. There is generally in this stage of the cleft a shortening of the soft parts, which not only renders deglutition difficult, but also greatly disorders the voice, by rendering it inarticulate and strongly nasal. Guttural articulation will be more or less imperfect in this, as well as every other modification of the infirmity, in proportion to the difficulty of closing the passage from the fauces into the nasal cavity during the efforts to enunciate. In this state these difficulties are considerably augmented; and, besides the disorders imparted to the nasal movements, they cause embarrassment in attempts at deglutition, which are often followed by accidents of a most loathsome and disgusting nature. The parts involved are disposed to excessive secretions of mucus, which, accumulating on the surfaces, becomes thickened, adhesive, and finally mucus-purulent, causing foetid breath and the expectoration of prodigious quantities of tough mucus. The rapid evaporation continually going on from the fauces and nasal cavity reduces the secretions very often to the condition of solids; and, when discharged, they resemble indurated crusts upon healing ulcers. This process, too, renders respirations somewhat metalline in its tracheal responses; and when the movements are accelerated, a whistling sound is produced. Stertor is a very common respiratory phenomenon with individuals thus

affected during the sleeping state, and they invariably breathe when asleep with their mouths open.

An extension of the cleft into the palatine, and occasionally into the palatine processes of the superior maxillary bones, and in some instances even quite through the alveolar processes likewise, constitutes the third variety of congenital division of the palate. In this interesting state of the infirmity, the inconveniences and defects incident to the previously considered varieties are greatly augmented. The voice is in a very great degree unintelligible, deglutition is executed with the greatest difficulty, and, in some instances, cannot be performed at all, thereby subjecting infants to the painful death from inanition. Generally much inconvenience is experienced; and to enable persons to take substances into the stomach, it is necessary to close the anterior openings of the nostrils, especially when fluids are to be swallowed.

In this state the cleft consists not so much in a division of the textures involved, as of actual deficiency or want of substance. The cleft is more or less extensive, and generally presents a chasm of appalling magnitude, the margins of which in many instances cannot be approximated or brought into contact, as in the varieties already considered, even when very great force is employed in the efforts. In some instances the fissures are bounded by narrow margins, which only serve to point out the dividing line between the nasal and faucial cavities, without affording any material portion of the natural septum; and they meet anteriorly, to form an angle more or less obtuse.

As far as our observations have extended, it is questionable whether these last varieties of the cleft do not impart less disturbance to the constitutional health than those of more limited extent. In these examples the uvula is so reduced in magnitude and modified in character, as to rob it of much of its natural and characteristic sensibility; and on this account the parts are less liable to the disorders generally induced in them in a natural state.

The conditions of the respiratory organs and movements are very nearly the same as those already noticed connected with the preceding states of the cleft. Possibly the larynx and trachea may become more arid, and the stertor during sleep louder and more sonorous, from the perfect inability of the velum to direct the air through the nasal passage on to the rima glottidis, larynx, &c. In consequence of the shortening and retraction of the uvula and velum, as well as the investing textures spread upon the palatine and other bones forming the floor of the nasal cavity, the cleft seems almost to convert the two

cavities into one; and to this peculiarity the difficulties of correcting the deformity in this state of its existence are chiefly attributable.

In no department of surgery has more inventive ingenuity in the construction of instruments been displayed, than in the operation for cleft palate, without, however, obtaining conveniences and facilities commensurate with the difficulties to be surmounted. Still the surgeon is enabled, with comparative ease, to treat most of the ordinary cases with the means now employed, but would be greatly aided in the management of every case by more convenient instruments and contrivances; and especially those generally conceded to be irremediable, or capable of only partial amelioration. It is an effort to supply some small additional aid, principally in regard to the latter description of cases, derived from our individual experience with this infirmity, which elicits the present humble contribution.

Before entering upon the examination of the surgical treatment of cleft palate, we will premise a few considerations relative to the circumstances which should favour or discourage the operation, and also touching the subject of constitutional or bodily preparation of individuals about to submit to surgical treatment in such cases.

From satisfactory trials, we are fully convinced that the most suitable age for this delicate operation is somewhere near or within the range of puberty. With females it may generally be safely attempted as early as the sixteenth year; but with males, not sooner than eighteen. To render the means demanded in the execution of staphyloraphy perfectly available, entire willingness and submission on the part of its subjects must be felt and exercised; without this, it would be next to impossibility to effect any thing in such cases. The head and body, tongue and fauces, and even the organs of respiration, require to be constrained in some degree to enable the surgeon to employ his means efficiently. An individual about to undergo the operation, should be old enough to appreciate both the suffering and painful privations connected with it, as well as the benefits likely to be conferred by it if successful.

In the selection of cases favourable for the operation, a strict regard should be had in every instance to the state of the general health. A feverish state of the system, or a depressed condition of the nutritive powers, as they never fail to retard or deteriorate the adhesive process, must invariably discourage the operation. Conditions the reverse will, if our views are correct, constitute the constitutional prerequisites most favourable for it. The operation should never be attempted while patients are suffering from cough; nor will it be safe to operate with females who have long laboured under fluor albus to

any considerable extent; or males affected with extensive suppurating and ulcerating conditions of the body, as each of these states greatly disturbs the adhesive process. Enlargements and ulcerations of the tonsils, especially if they are the result of a strumous susceptibility and catarrh, should also discourage the operation; so far, at least, as to induce a doubtful prognosis.

The success of this delicate operation will, in a very essential degree, be influenced by the season of the year at which it is performed. We therefore invariably select summer or mid-winter as the most favourable periods. These seasons being less subject to sudden and frequent transitions of temperature, the patient is less liable to catarrhal affections; and it is on this account chiefly that they should be preferred for staphyloraphy, as well as other delicate operations about the mouth, fauces, eyes, ears, &c.

From some experience we have long since unhesitatingly discarded the belief that a constitutional preparation by medicinal agencies, diet, &c., is demanded as an indispensable prerequisite to a large majority of operations. So far from subjecting our patients to such measures, we have, with few exceptions, preferred to operate without disturbing the balance of health in any way. In most surgical diseases unattended with fever, we do conceive that any change effected by medicines would essentially perturb the constitution, and induce more or less of that irritative susceptibility in its secretions so much disposed to invite traumatic fever and inflammation. Fully impressed with the importance of these views, we would advise against any reduction of the stock of constitutional vigour as preparatory to the operation for cleft palate, unless a feverish state actually demands it. The only constitutional change demanded, are such as may be rendered necessary to acclimate individuals who may possibly reside in locations essentially different from those resorted to for surgical aid. With all such it would be proper to delay the operation for some time; and possibly, too, a change of diet, as well as the administration of medicines, might be required to aid in the work of acclimation, should individuals inhabit malarial regions.

As a preparatory surgical measure, we would in some of the cases of cleft-palate, advise that the uvula and velum should be familiarized as far as possible to the touch of instruments, or of the finger. To effect this end, these sensitive organs should be frequently subjected to the application of probes, forceps, and the extremities of the figures. At first the impressions will generally prove so irritating as to provoke retching and sometimes emesis; but a perseverance in the trials will finally, and in a very short time, render the parts in a great

degree insensible, and capable of being touched without much inconvenience. This acquired insensibility will greatly aid the surgeon in his delicate manipulations; it will also lop off from the operation one of its most disagreeable concomitants, the retching, and thus at the same time accommodate the patient and surgeon. To uvular cases, and when the division extends only partially into the velum, these preparatory measures are more especially applicable.

When the operation is to be executed, the subject of it should always be seated in a chair of convenient height, with a moveable back, regulated by a screw, similar to a barber's chair, upon the upper extremity of which a head piece must be fitted for the reception and support of the head, and padded or cushioned. The most favourable exposure for this operation is a southern one: the operation may nevertheless be executed and with much ease subjected to the mild light of a northern exposure, in which situation we once operated without the least deficiency of light. The patient must be so placed that the light shall enter the mouth obliquely, or the surgeon so place himself as to contemplate the parts in a line passing near the commissures or angles of the mouth, so as not to intercept the light in its passage to the fauces with his head or hands. The period between the hours of 11 A. M. and 2 P. M., is the most favourable, as affording the best light.

After the patient is properly seated, and the head inclined upon the cushion of the sliding back of the chair, so as to give the light its direct passage to the fauces, the jaws are then to be separated and kept asunder by interposing between the teeth a soft bit of wood of convenient width, and thick enough at the edges where in contact with the teeth to prevent a rocking motion, which the inferior jaw is disposed to impart to it, and which might result in its displacement, if resting upon very thin and narrow bases. The opposing margins of this bit of wood should be parallel, and the sides and ends excavated. The ends besides being hollowed out, must be pared or rounded off to a thin smooth edge; the length of it to be from one and a half to two inches; which completes the initiatory stage of the operation.

When the cleft is confined to the uvula, or to this as well as the velum at the same time, any of the modes which have been adopted and practiced from the date of Graefe's first operation down to the present time, may be pursued. But the operation, as contrived and executed by Dieffenbach, unites more advantages than any other of which we have seen an account, and should generally be preferred in the simple examples of the infirmity. In our own hands it has been successful more than once; and in the execution by no means difficult or troublesome. As performed by this dexterous operator and dis-

tinguished rhinoplastie surgeon, staphyloraphy consists of three steps: 1st. The denudation of the margins of the fissure by paring away its edges. 2ndly. The application of the ligatures or sutures. 3dly. The approximation and confinement of the margins so as to maintain their coaptation; and so far as our own experience enables us to decide, these constitute the only safe and rational series of operative agencies adapted to such cases. The introduction of the leaden ligature by Dieffenbach, in the place of the materials ordinarily employed in this operation, we regard as one of the most important improvements which it has received. Besides the mechanical advantages of this ligature, it possesses the peculiar power of paralyzing the absorbing agencies so far as to enable it to remain longer in the animal textures without loosening, or cutting itself out, than any other known substance.

The patient being placed as described in our directions in regard to the initiatory stage of the operation, the surgeon with a delicate double hook, or forceps gently curved and perforated in several places near the extremities of the blades to enable them to retain their grasp more securely, and directed by the right hand, takes hold of one of the margins of the cleft, as near the extremities of the uvula as possible, and exterior to the edge sufficiently to expose a narrow belt between the border of the cleft and blades of the instrument. Having secured the margin, he now passes the handle of the instrument into the left hand, with which the parts are to be gently elongated by drawing them downwards and forwards until moderately tense. With a crucial knife, or an instrument of its delicacy, and possessing two cutting edges supported by a neck-like shank, and a handle of convenient size and length, he next proceeds to denude the margin of the confined lips of the cleft. This is to be effected by inserting the point of the knife as near the apex of the uvula as possible, and carrying it edge foremost quite up to the angle of the cleft, so as to separate a very thin portion of the tegumentary covering from the border of the lip, which is confined still by attachments at the angle and uvula. Great care should be taken to remove no more of the substance from the margins of the lips of the cleft than just sufficient to denude them perfectly through their whole extent. By forming the section from below upwards, the effusion of blood will not invest and obscure the delicate parts to be incised, and thus perplex the operation; on the contrary, the operation is by that means rendered more easy, certain, and precise in the execution, and may be, at a single stroke, accomplished in many instances. As soon as the section has reached the angle, the knife, by reversing the movement, may be directed to the uvula, and the denudation of

this portion of the margin effected by a continuous cut in that direction. Sometimes it will be found most convenient to effect this part of the operation with a keen pair of scissors, in consequence of the shrivelled and yielding nature of the uvula. The uvula may now be released, and all further efforts suspended until the bleeding ceases. In all cases of the operation it is adviseable to delay no more time in its prosecution and completion, than is absolutely necessary for the subsidence of the traumatic hemorrhage, and short respites from pain, as the parts soon become morbidly sensitive, and from this cause might not only greatly increase the pain of the succeeding steps of the operation, but endanger the adhesive process by predisposing to disorganizing inflammation in the parts involved in the operation.

As speedily as possible the surgeon should proceed with the denudation of the margin of the opposite lip of the fissure, which is to be executed as just described. When completed on both margins of the cleft, the portion excised should resemble in form the letter V inverted; and, if possible, must be removed entire to enable the operator to know positively that every part of the edge is denuded. The parts may now be freely washed with cold water held in the mouth, and by gently gargling with it. This represses the bleeding in a few minutes, and allays, in a great degree, the pain.

We prefer denuding the margins of the lips before inserting the ligatures for several reasons, but chiefly because by that means the possibility of dividing them is precluded; the sutures may be inserted at more equable distances from the margins, and because the most painful step of the operation is reserved for the conclusion of it. Hemorrhage, from the denuded margins, cannot be adduced as an objection of any weight to this or the first step of the operation, as it ceases in a few moments after the incisions are formed. Nor should the few moments intervening between the denudations and insertion of the ligatures form an objection to it, as they certainly cannot, or have not, in our hands at all affected union by the first intention. In Mr. Alcock's case, the partial union was the consequence of insufficient support to the denuded edges of the lips of the cleft, by reason of not inserting a sufficient number of sutures to approximate them closely and steadily, and with a force adequate to their complete coaptation. His failures could not have been the result of the denudations before the insertion of the ligatures, as the success which followed early denudation, and the pins, clearly proves that in the first operations that the margins were either imperfectly coaptated and supported, or the margins were insufficiently denoded.

We object positively to scissors as an instrument for the removal

of the margins of the lips of the cleft—so far as they have been recommended in the preceding directions excepted—as being unhandy and exceedingly uncertain in their execution: as forming a cut surface more or less convex, besides pinching and bruising the parts at the same time, which must, in some degree, interrupt their union by the first intention. Moreover, should the margins of the lips of the fissure be bounded by inequalities, or indentations exist to any extent, it would be impossible to denude them with seissors only, without removing more of their substance—already, perhaps, greatly deficient—than would be justifiable or proper.

The second step of the operation, or the approximation of the denuded margins of the lips of the fissure may be attempted as soon as the bleeding ceases. For its accomplishment the *porte-aiguille* and needle generally employed, will be found both handy and efficient instruments. Dr. Warren's *porte-aiguille* is, perhaps, as convenient as any; but it is defective in the formation of its thimble-like cavity, for the reception of the eye-extremity of the needle, without a throat or fissure on the inner aspect of the short branch, or proper needle-port. The instrument of this construction which we prefer is seven inches long, something less than two lines, say one and a half, in diameter, with a recurvation of the *porte* extremity, and a branch not less than four lines in length, containing a very delicate thimble-like cavity, its whole length perfectly cylindrical, and opened on its internal face by a fissure, extending quite to the bottom of the cavity: the fissure should only admit a common sized ligature, and should be well smoothed and polished. At the handle extremity, it would be most convenient to have the shaft of the *porte* of an octagonal form as far as it is to be embraced by the fingers of the operator; the remainder of it may be round, and must be well polished. The recurved branch should not be parallel to the shaft, but must stand a little off from it, with a space of fully two lines in extent between them. The needle which has been employed in our operations, when it has been found most convenient to use this form of *porte-aiguille*, should be not less than seven lines in length, of sufficient diameter for the formation of eyes of convenient capacity, and should have two eyes of equal size in close proximity and near the obtuse extremity of it. The point of the needle should be flattened and rendered very delicate at its extremity, while the eyed portion of it, as far as it shall be embraced by the thimble-like cavity, must be round and formed to fill that cavity with tolerable accuracy, but not so tightly as to prevent its easy insertion into, and removal from the cavity. (See *Plate, Fig. 2.*)

From what has already been intimated, in regard to the metallic ligatures, we shall be anticipated in giving them a decided preference, as a means of approximating the margins of the cleft, and our experience with them warrants the belief of their vast superiority over every other material for such uses. Besides the advantages already considered, "They allow of being tightened or loosened at pleasure, and an opportunity, during the operation, of examining the parts without becoming soft or unmanageable, as the common ligature is apt to do, when softened by the saliva or other fluids of the mouth." The ends of the wire being twisted together after the margins are approximated, confine them securely; and if, from the supervention of a high degree of traumatic inflammation and swelling, fears are entertained for the safety of the textures, unless the sutures can be relaxed, they may be loosened at once, and without pain, simply by untwisting the ends of the wires partially, until the undue tension produced by them is relieved. The greatest convenience afforded by the metallic ligatures in the execution of this operation, results from the gradual and unyielding force exerted by them in approximating and confining the denuded margins in exact apposition; and by their enabling the surgeon to augment these agencies, from time to time, without much pain to the patient, or the least danger of disturbing the position, or the adhesive process of the parts involved in the operation. Little or no difficulty, in most cases, attends the application of these ligatures, if they be sufficiently delicate.

Besides the *porte-aiguille*, needle, and metallic ligatures already described, it will be necessary, as preparatory to this step of the operation, to be provided with several silken ligatures of a size to suit the eyes of the needle which may be used, and a pair of forceps of sufficient length to reach the uvula, without obliging the surgeon to carry the hand, with which the instrument is held, so near the mouth as to intercept his view of the parts. The silken ligatures should be well waxed, and from three to four inches in length: with one of them the needle is to be armed by doubling it in the middle, then inserting the end of it into the eye nearest the point, and drawing it through so as to form a noose five or six lines in length, and carrying it back again through the remaining eye to the side at which it was first inserted, and drawing the portion of it between the eyes close to the shaft of the needle. This arrangement places the noose and extremities of the ligature on the same side of the needle, where they hang. The leaden wire should now be appended to the noose of the silken ligature, by one of the loops previously formed at its extremities, which must be made to embrace it very closely, by gently striking the

loop at its flexure, with a bit of wood. The wires, after they are cut off, and the loops formed at their extremities, should be three inches in length. Thus arranged and armed, the needle may be inserted into the thimble-like cavity of the porte, care being taken that the extremities of the silken ligatures shall both hang through its throat. The advantages of this contrivance will at once present themselves to the intelligent reader. Fitting the socket of the porte, and the silken portion of the ligature, which may now be denominated compound, hanging through its throat, it is clear that the position of the needle cannot be varied, or a rocking motion imparted to it, when the point is forcibly urged against a body to be transfixed, as in the execution of this step of the *gaumennath* operation. Thus armed, the surgeon directs the porte extremity of the instrument with the right hand into the cleft, and carrying it upwards and backwards until the point of the needle clears the nasal aspect of the lip of the fissure, he turns it over the margin by rotating the shaft of the porte between the finger and thumb, giving it at the same time a lateral motion towards the lip. Having directed the point of the needle so as to transfix the lip of the cleft from one to two lines from its margin, and as near the angle as may be necessary to approximate the denuded surfaces between the points at which the needles are to enter and the angle, by a retracting movement the needle must be brought through the lip until its point presents fully a line or a line and a half on the faucial side of it. Passing the porte now into the left hand, the surgeon, with the forceps in the right, takes hold of the presenting portion of the needle, and draws it downwards and forwards from the socket of the porte, and through the lip of the fissure into the mouth. The porte must now be removed by making it retrace the movements pursued when introduced; and, without loss of time, the compound ligature should be drawn in the direction of the needle until the metallic portion of it has entered the cavity of the mouth a few lines beyond the loop. In the execution of this step, less difficulty will be incurred than might be imagined, especially in making the metallic portion of the ligature traverse the puncture formed by the needle. As soon as the slight bleeding which follows the passage of the ligature ceases, and the loop of the other extremity of the wire is connected with the noose of the same or a new silken ligature, and the porte armed with the needle, the ligatures should be inserted in the opposite side of the cleft, in the same manner, and at a point as nearly opposite to the first as possible. The two ends of the wire must now be brought together; first, by gently drawing them on opposite sides with the forceps until they remain nearly in contact, and in some degree approximate the mar-

gins; they may then be taken hold of with the forceps, and gently drawn downwards and forwards until the opposing margins are brought into contact, and the extremities of the wire below the oral or faucial surface be rendered straight and somewhat tense. Still held in the grasp of the forceps, they are next to be twisted together by a gentle motion from left to right until the denuded margins are held in contact by them. The twisted portion may now be cut off to within five lines of the noose. In as rapid succession as possible, compatible with safety, the remainder of the sutures may be applied as already described, until a sufficient number to close the cleft shall be introduced. From one to four will be sufficient to close completely a very extensive congenital cleft; but the number of the sutures, and the distance between them, must be regulated by the peculiar circumstances of individual cases. In their introduction, very especial care will be required that they shall not pucker the margins, which will certainly be the case if the points at which they transfix their respective lips are not exactly opposite. When a sufficient number to close the fissure are inserted, they must be carefully but effectually tightened in alternation, commencing at the angle, and continuing the process on to the uvula. There will be some danger of increasing the force of the ligatures to a disorganizing extent, unless some easy method be adopted for its regulation. In our operations, we have continued to apply the force by twisting the ends of the wires together until the ends thus formed stand out firmly, and, when touched with the forceps, vibrate with the spring and elasticity of the bristles of a brush, which they will not do, unless the edges are confined steadily together by them. Taking this, then, as our guide, it will be very important to observe the effects carefully,—as the wires, in this stage of their tightening, are twisted,—and not to materially increase their force subsequently. The same conditions of the projecting ends of the wires will also enable the surgeon to determine, during the secondary treatment, whether or not the sutures are doing their duty, and when they may or may not require to be tightened.

After the sutures have been well tightened, the twisted ends should be cut off with scissors, within three or four lines of their respective loops. The parts may now be very carefully washed, by repeatedly filling the mouth with cold water until the blood is removed. This completes the operation. In most cases of cleft palate, the needle-porter, which has been considered, will be found both handy and efficient. But cases occasionally occur in the treatment of which it cannot be employed with convenience or advantage, and for those examples more especially we have contrived two other needle-porters,

though they will be found equally applicable, particularly one of them, to every case in which the one already described can be used. There is an especial advantage in possessing a variety of instruments for such an operation as staphyloraphy, as it not only enlarges and extends the surgeon's resources, but inspires him with confidence in those resources, as well as increases his stock of self-possession from the belief that he is well supplied with the means to guard him against a surprise in a sudden emergency.

The first of these instruments we shall describe under the name of the injecting or cannulated needle-porte. It consists of a cannula of the length and form of the porte already described, one line and a half in diameter; the calibre of small size, so as not to weaken the instrument by rendering it too thin in its walls; with a fissure or throat on the inner aspect of the short branch extending to the beginning of the curve which supports it, and communicating with its portion of the canal; and a sliding shield on the corresponding side and directly upposite to the extremity of the short branch. The opening into the cannula, at the handle extremity, must be square for the reception of the stiletto, which should also be square, and made to fit the opening just described, accurately but easily. It should be formed of steel, with a handle of convenient construction, to project fully an inch beyond the handle extremity of the cannula, and a chain in that part of it which is to traverse the curve and short branch, extending quite to its extremity. The whole instrument, with the exception of the stiletto, should be formed of silver of the hardest kind. The needles required for this porte differ very little from those already described: indeed, there will be a convenience in having them of the same form and size, as they may then be used indiscriminately and without the trouble of accidental transposing, as might sometimes take place when several descriptions are employed. With this porte the needles should be accurately fitted for reasons already expressed. (See *Plate, Fig. 4.*) This instrument was contrived and employed by us for the first time in 1830. In 1832 we had a second set constructed by Mr. Schively of Philadelphia. We make these statements to show, that although our instrument resembles in principle the ingenious contrivance of Dr. A. E. Hosack of New York, its invention preceded, at least, three years the publication of his memoir, in which his instrument is figured and described, and that we are indebted to no precedent for its invention.

The directions for the arming of the porte will be anticipated by a reference to the instrument itself, and will not be more particularly given in this place, as well as those to govern and direct the introduc-

tion of it into the fissure, as they too, have been anticipated in what we have remarked relative to the first porte described by us. The extremity of the short branch, armed with its concealed needle, is to be placed in contact with the appropriate portion of the lip of either side of the nasal surface of the cleft; the ring of the shield, previously retracted, is now to be depressed and made to embrace the opposite surface of the lip with some degree of firmness. Thus confined and fixed, the intervening portion of the lip of the fissure must be transfixed, by forcing the extremity of the retracted stiletto against the opposing or obtuse end of the needle. This procedure, from the convenience of the instrument, can be accomplished with very great facility, and after some little familiarity with it, will only require to be used with one hand; the projecting needle may be drawn through with its associate compound ligature, as already advised. Reversing the movements, will enable the surgeon to disengage the needle-porte, and to withdraw it from the mouth. By repeated reapplications of this instrument, properly armed, sutures may be introduced in succession, in sufficient number to approximate the lips of the cleft completely, as well as to confine them in apposition.

The advantages of this porte are obvious and decided. Besides enabling the surgeon to execute the passage of the ligatures with precision in the more fixed portions of the lips of the cleft, it will be found especially convenient when the parts are vacillating and pendulous. It will be particularly adapted to applying ligatures to the velum and flaccid uvula, as well as to an operation which will be described in the sequel. By compressing the parts between the opposing powers of the short branch and ring of the shield, and at the same instant transfixing them by a sudden injecting application of the stiletto to the needle, less pain is experienced, and the operation executed almost instantaneously.

The second needle-porte which we have constructed was also contrived in 1830; and although originally for a very different operation, will be found well adapted to certain conditions of the operation of staphyloraphy. It is denominated the ginglymoid, or moveable angular needle-porte, and is exhibited in the plate, *fig. 5*.

This instrument differs little in the principles of its action as a needle-porte from the first which has been described in this paper. It is chiefly for its varying forms that we regard it as useful in the gummennath operations, and this property adapts it almost exclusively to the partial divisions of the velum from accidents; or imperfect reunion of the lips after an operation, when only a small portion of the fissure remains ununited. In either of such cases the sutures could not be

applied with the portes already described, because it would not be possible to pass their porte extremities through such small clefts into the nasal cavity, at which surface of the lips the sutures should always be inserted. The instrument we are now considering, from its delicate and slender form, can with ease be rendered applicable to all such cases.

The arming of the angular needle-porte consists in adapting the needle, previously armed with a compound ligature, to the mother screw in the extremity of the short branch, (which should be screwed up from its fossa in the long branch sufficiently to render it accessible,) by one or two turns, merely to enable it to take hold. The needle being well adjusted, may, with the supporting short branch, be screwed back into the groove of the shaft, until its point is carried below the margin of the groove. In this condition the porte extremity of the needle-porte must be made to enter the fissure, and to pass on into the nasal cavity until the point of the concealed needle may be supposed to have cleared the nasal surface of the lip of the fissure. Observing carefully the position of the needle, and taking care at the same time that it is on one of the sides of the fissure, it must be screwed out from the groove until the point has been carried at least one line and a half or more over the corresponding lip of the cleft. The instrument may now be retracted, which movement almost instantly urges the point of the needle through the textures with the supporting short branch of the porte. These manipulations are supposed to be executed with the right hand chiefly, and with such assistance as may be necessary from the left. As soon as the point of the needle appears distinctly on the faucial side, the handle of the porte must be passed into the left hand and held by it. The surgeon now, either with the forceps or a brass or silver rod, with an eye formed in the extremity to receive and accurately fitted to the needle, may by a turn or two unscrew and draw it downwards into the mouth, with the compound ligature connected with it. The short branch of the porte must now be disengaged from the lip by reversing the movements, and, as soon as released from the textures, may be depressed into its hiding place in the shaft of the instrument, and the porte retracted from the fissure and mouth. By repeating these several steps and manipulations, as many ligatures as are requisite may be inserted into the opposite side of the lip of the cleft.

This instrument, though somewhat complex in its construction, is easily employed, and with far less inconvenience than would be imagined. In some of the cases to which it is adapted, no other contrivance known to surgeons could be employed at all.

By fitting the needle accurately to the socket, the screws might be dispensed with, which would in some degree facilitate the passage of the needle and ligature. But unless made to fit very accurately, the needle might be displaced from the socket in passing the porte through a narrow cleft; when formed without the screw, the eyes should be placed near the blunt extremity of the needle, and the socket cleft on the inner face of the porte, as already described.

The operations described in the preceding pages, as already remarked, are designed for the correction of the more simple forms of cleft palate, situated either in the uvula, or the uvula and the velum at the same time. They may also be rendered efficient in some of the examples in which the fissure involves the bony palate, or even the palatine processes of the superior maxillaries, when it exists as a fissure only, and without any material deficiency of substance. But when there is a separation of the margins to an extent which will not allow them to be approximated, besides the fissure, these methods alone will not be found sufficient, and for the correction of the deformity, other expedients must be resorted to. We have met with cases of congenital divisions of the palate in which the margins were separated to so great a distance as to defy every effort to approximate them, aided by the means generally employed; and to remedy them we were compelled to draw upon our inventive resources.

The first operation contrived by us in a case of this description, consisted of a series of incisions more or less extensive, formed exterior to the margins of the cleft, and parallel with them, extending from the faucial to the nasal surface on both sides. These incisions being designed as granulating surfaces, were not allowed to reunite by the first intention, but kept apart by interposing between them small portions of buckskin or soft sponge, there to remain until suppuration should be well established, and then to be removed. Incising from the supporting portions of the lips of the cleft a belt more or less wide, and supported at each extremity by the natural continuity of the textures through which they may be nourished by blood, enables us to create an extensive surface for the eliciting and rearing of granulations without the least hazard or danger of disorganizing the parts separated, or their respective lips. In this condition they take on inflammation, which speedily terminates in suppuration; and granulations soon sprouting out from these newly created surfaces, fill up the incisions by which they are separated, and thus widen the lips to a greater or less extent. The first incisions are to be the most extensive; and as the lips are expanded, they should be less so, or

the cicatrices may ulcerate or become disorganized and slough. The newly formed parts cannot be safely incised until perfectly organized. It would be most safe to form the succeeding sections exterior to the cicatrices and in the original textures, as they granulate most readily and freely, and are not liable to ulcerate or slough. Should the parts be deficient in length, the method which we have been describing may be employed in a transverse direction, guided by the views just submitted, but not to divide the tensor palati muscle. Should much inflammation supervene, the parts may be bathed with demulcent and emollient liquids, cool or warm, as may be found most grateful. These agencies may be repeated, after proper intervals of repose, as often as may be required to give to the lips the degree of expansion requisite for the easy approximation and contact of their margins; and as soon as this is accomplished, the operation already described for the correction of the infirmity may be resorted to.

Cures by this method must necessarily be tedious, and the time required for their accomplishment more or less protracted, as the cases are distinguished by fissures of greater or less extent, or lips thin or the reverse.

By this plan, we once succeeded in dilating the lips of an extensive fissure, so that when the patient left us, the opening remaining presented a small perforation only, barely a line in diameter, instead of a chasm, which, when the patient was placed under our care, readily received three fingers without being filled. In this case the voice was greatly improved, as well as the power of deglutition, and enough was accomplished by the operation to prove its utility in similar cases.

The tedious nature of this operation induced us, in another case in which we were consulted, to modify it in such a manner as to render the cure more expeditious; and, although more difficult of execution, as well as painful to patients, we feel confident that it is an important improvement.

The operation consists in making the sections of the lips of the cleft oblique instead of perpendicular, as in the preceding operation; and, as it were, to divide or split them, so as to separate the nasal from the faucial portions of the lips. This method unites the advantages of the flap and granulating process. To be enabled to execute it with the greatest facility, the surgeon must be provided with suitable instruments, particularly several scalpels, for dividing the lips, of the form already described; (only those now required must be more slender and delicate, and terminating in points somewhat obtuse, with the blades six lines long, two wide, and rendered perfectly keen in all their cutting parts;) also several delicate hooks, of different sizes,

and a pair of slender forceps, constructed with a spring to close the blades,—all of suitable lengths.

Thus provided with instruments, and having the patient arranged as we have described in the initiatory stage, the surgeon commences the operation by denuding the margins of the lips of the fissure, as already described. As soon as the bleeding ceases, an incision is to be commenced in one of the lips, a little exterior to its margin, and a few lines anterior to its uvular verge. The marginal incision on the faucial surface should commence nearly a line and a half or two lines from the margin of the lip. At this point, the knife is to be inserted, and directed in such a manner as to cut the lip obliquely from a line continued from the point of its insertion parallel with the margin of the lip to the angle, to another line passing in or near the base of it on its nasal surface, thus forming the section in the diagonal between these points of the faucial and nasal surfaces of the lips of the cleft. Before forming the section, it would be advisable to fix the lip as already directed, and then, by a continuous incision from the point of insertion upwards and forwards to the angle, to execute the cut. Employing the forceps, now, or one of the hooks, the surgeon may continue the operation, using those instruments to dilate the incision, as he now forms it, by cautious dissection in the direction of the angle, and in the diagonal line between the two surfaces, until it reaches the nasal surface, near the base of the lip. In the execution of this step, great care will be required to guard against cutting through the flaps too soon, and to form them as nearly of equal thickness as possible. It will always be found most convenient to dissect from the uvula upwards, as by that means, the blood, which otherwise might essentially perplex and embarrass that step, will, in some degree, be avoided. These incisions should always extend a few lines above the angle, and must never be carried nearer than two or three to the uvular margin of the lip of the cleft.

The section of the opposite lip may be accomplished, in the manner just described, as soon as the bleeding from that already accomplished ceases. For reasons already stated, cold water should be freely used for some time after the traumatic bleeding is repressed.

The ligatures must now be introduced, and with as little delay as possible, or the lips may become so tender as to render their application exceedingly painful; and, should much time be delayed, even dangerous. For this purpose, the cannulated needle-porte, armed as already directed, should be employed; indeed, no other instrument of which we have seen an account can supply its place, in consequence of the loose and vacillating condition of the lips. The sutures are in

these cases to be inserted a little interior to the margins of the labial cuts on their faucial surface, so as to permit a belt of the natural covering of each lip of the cleft to be interposed between the denuded margins and the incisions, and embraced by the noose of each of the sutures. The directions already given with respect to the most proper portion of the cleft at which to commence the introduction of the sutures are here reiterated, and under no circumstances will it be prudent to deviate from them, or to begin the insertion of the sutures of the lips elsewhere than at the angle of the cleft.

Although we have described this mode of operating for cleft-palate as if executed upon the lips of the fissure their whole length, it is not to be inferred that we advise the measure in every case. On the contrary, this will seldom be safe, especially when the fissure is very extensive. The sections may be formed as we have described them, the whole length of the lips of the cleft, but it will not be safe to attempt to insert ligatures, at the first operation, to more than a third or half of the margins thus incised. By attempting too much at once, the chances for relief may be lost by the supervention of disorganizing inflammation, and the ulceration or sloughing of the lips. Executing the operation at different times, and after proper intervals of rest, and proceeding from the angle towards the uvula, it may with safety and a very great probability of success be employed even in cases of most extensive vacuities of the palatine septum. Those portions of the lips to which ligatures are not applied will be subjected to the dilating agency of the granulating process, and from this cause, when subsequently to be approximated by the diagonal section, may more easily and certainly be brought into perfect contact. To enable the surgeon to give to this mode of operating all the chances of success available through its several steps, each of which sustains important relations in the series, it will be necessary that time be allowed, not only for their regular and proper execution, but for the subsidence of all previous inflammation, and the perfect consolidation of the parts before another operation can be attempted with safety. In a word, it will not be prudent or safe to repeat any of the steps of this operation very soon after the lips of the cleft have been extensively incised or sutures applied. After the margins of the denuded and incised lips have been approximated and firmly united at the median line of their contact, and sufficient time has been allowed for the subsidence of the several traumatic, irritative, and inflammatory movements, as well as for the consolidation of the union of the parts involved in the operation, the remainder of the cleft may be closed in the same manner, only extending the diagonal section now quite through the uvular margins, which, after they are

approximated in the line of the fissure by the suture, but not confined in close contact, may themselves have sutures applied on their posterior margins, merely to prevent the displacement of the cut edges, and to keep the surfaces in contact as far as they are opposed to or overlap each other. This operation will be required in the cases attended with great deficiency of substance, and will, if properly executed, restore the septum and continuity of these parts, and in a great measure prevent the shortening of the uvula and velum, so apt to result in such cases.

Should the uvula and velum, however, be well developed, and possess substance sufficient to allow of their easy approximation and contact by the sutures only, this portion of the fissure may be closed and secured by the operations already described for the cure of the more simple forms of the infirmity. This operation will be equally applicable when the fissure extends entirely through the palatine and alveolar processes of the superior maxillary bone, with or without a division of the lip, and when the margins of the cleft, as is usual in such cases, are permanently separated. But when the lip is involved, and the case complicated with hare-lip, staphyloraphy, as well as the operation for this last infirmity, will be demanded. In such a complication, the bony cleft must first be corrected, as the parts then will be more easy of access to the operator, and the operation more easily executed, while the division of the lip remains open: after the long cleft is closed, the operation for hare-lip may be performed at once, or after the cure of the fissure is perfected.

It will be perceived from the direction and form of the section adopted in the execution of the operation we have been describing, that the action of the sutures, in approximating the margins of the lips of the fissure, also serves to maintain the contact of the cut surfaces. By drawing the superior or nasal surface down upon the inferior or faucial, their union, as far as they are in contact, is essentially favoured; and where they are not in contact, the granulating process soon brings them together by filling the vacuity, and at the same time expands and widens the lips of the cleft—thus placing the parts in a more favourable condition for succeeding operations.

The operation we have been describing is far less painful than “*a priori*” might be imagined; and with properly constructed instruments, for executing the sections, can be performed with comparative ease to the surgeon, and entire safety to the patient. When the advantages secured by it to the patients are properly appreciated, the pain necessarily connected with its execution ceases to be an object of fear with them. Without some such rhinoplastic effort, as has been

described in the preceding reflections upon this form of the infirmity, it would not be possible to correct, even in an imperfect degree, its inconveniencies and disgusting deformities.

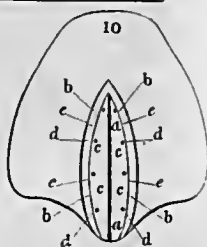
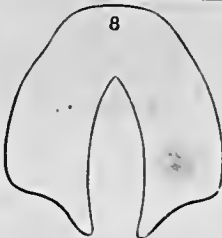
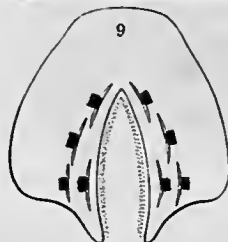
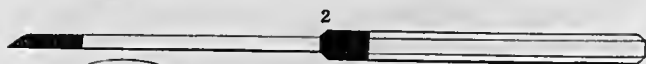
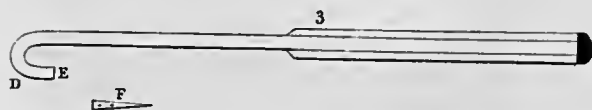
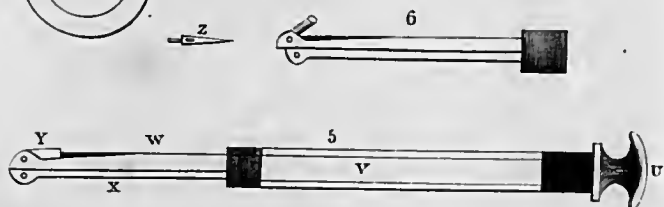
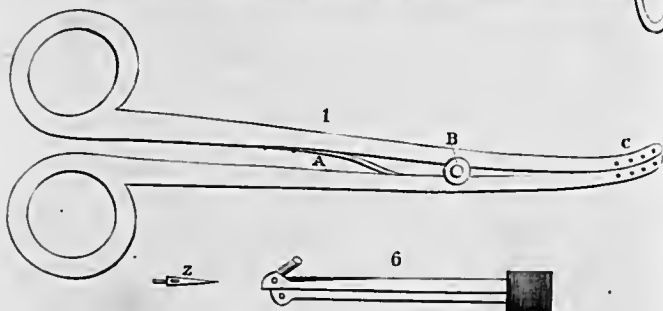
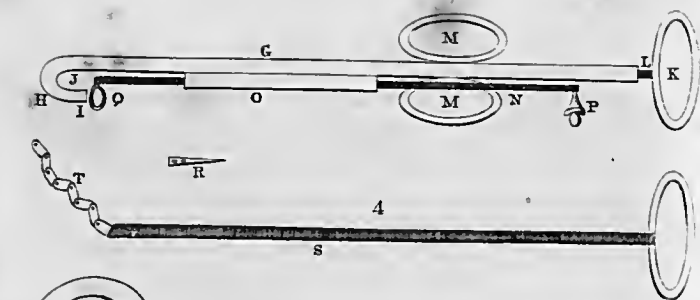
In the traumatic stage it will not generally be necessary to employ any other topical measures than merely to allay the nervous irritation of the parts soon after the operation, and to moderate the inflammation, should it seem disposed to assume a character of inordinate intensity, and for this purpose, the cold water (already advised) soon after or during the operation, with cool or tepid demulcent washes of elm tea, will be found fully sufficient. Generally, the copious effusions of mucous, and other secretions, which so abundantly bedews the fauces, mouth, and posterior nares, render topical applications unnecessary.

A form of traumatic irritation exceedingly apt to follow the operation for cleft palate, and subjecting individuals to excruciating suffering, is that distressing species of headache generally regarded as nervous. From this affection, as a traumatic result, all surgical patients suffer more or less; but in consequence of the near proximity of the nervous filaments, wounded in staphyloraphy, to the ordinary seats of neuralgic pain, it is more liable to follow the operation in violent degrees, than any other. It is indeed neuralgia, and in many instances, of the most intense and violent form.

With individuals of strongly marked nervous developements, it would always be proper, immediately before or after the operation, to administer a commanding nervine, or narcotic, as the one or the other may seem to be indicated, by a deficiency of mobility, or excess of sentient life of the nerves of sensation. By employing such means before distressing pain comes on, much additional suffering may be prevented.

Should a feverish state follow, it must be corrected by the early employment of cathartic enemata, and, should these fail to afford relief, the lancet must be resorted to. These remedies, aided by rigid abstinence from food of every kind, will generally arrest any fever which may follow; and they will also tend essentially to restrain the traumatic inflammation, and favour adhesion. The introduction of medicine into the stomach would endanger the co-adaptation of the parts, and is inadmissible at this stage. Patients, to enable them to carry out the system of rigid abstinence from food, drinks, conversation, and whatever might tend to excite the organs of deglutition and speech, will be greatly aided by spending the three first days after the operation, closely confined in bed, in a dark, quiet room.

The condition of the sutures, as well as that of the margins, should



be carefully examined into daily, so as to enable the surgeon to apply the proper means for tightening the sutures at once, should such a step become necessary; or to relax them if they seem to be exerting an injurious force upon the inflamed lips of the cleft. Some nourishment may be allowed on the third day, and as semi-fluids are most easily swallowed, this form should be selected for the administration of food: rice gruel rendered thick by long boiling, generally answers best in such cases. Thick soup may also be used if the tendency to sink from the long inhibition of food, is considerable. Enemata of nutritious fluids may also be used if patients become enfeebled and faint before it would be safe to take nourishment by the mouth. To prevent, in some measure, the pains and sufferings from the necessary fasting in this operation, we have been in the habit of requiring our patients to partake freely of solid food a short time previous to the operation, and we believe by this expedient we have saved ourselves, as well as our patients, much trouble and inconvenience. When food can be allowed, it should only be taken in very moderate quantities at a time, and after long intervals.

As soon as the union between the lips has become firm the sutures may be cut away; generally on the sixth or seventh day, the first nearest the angle may be removed; and on alternate days, as shall be found safe, the remainder may be removed. This may be effected without pain, and with great facility, by simply cutting one of the branches of the wire a little below the twist, and drawing it away with the forceps already embracing the end of the twist.

EXPLANATION OF THE PLATE. *Figure 1.*—Forceps for confining the lips of the cleft for denudation. A, Spring for closing the blades. B, Rivet. C, Perforations to enable them to retain their hold more accurately. The forceps for drawing and twisting the wires should be straight, with a similar spring, wider blades, and without perforations.

Fig. 2.—A delicate two edged scalpel for dividing the margins of the lips of the cleft, and for making sections of the lips either perpendicular or oblique.

Fig. 3.—Needle-porte of the most simple construction. D, The recurved or short branch with the socket E for receiving the needle F with two eyes, and the fissure or throat to admit the two extremities of its ligature when armed.

Fig. 4.—Cannulated or injected needle-porte. G, Canoula; H, short or recurved branch; I, its canal; J, the throat; K, ring of the stiletto; L, stiletto perfectly square; MM, rings or handles of the long branch; N, sliding handle of the shield, confined by the square canal O; P, handle; Q, elliptical ring; R, needle for the canal of the short branch with two eyes; S, stiletto with its chain-like appendage T.

Fig. 5.—Ginglymoid or moveable angular needle-porte. V, handle; U, thumb-screw; W, shank; X, sliding lever; Y, needle-porte; Z, needle with one eye.

Fig. 6.—Represents the shank sliding lever; and the porte elevated from the

fossa in the shank, by the action of the screw impelled by the thumb-screw at the handle extremity.

Fig. 7.—Eyed-rod for unscrewing the needle from the porte.

Fig. 8.—Bifid palate occupying the uvula, velum, and palatine bones, with a deficiency of substance which will not permit the margins to be approximated and brought into contact.

Fig. 9.—The cleft treated by perpendicular incisions, and tents, for the purpose of widening the lips through the dilating agency of the granulating process. This figure represents the wires of the incisions with the extension of the lips effected, as indicated by the dotted lines.

Fig. 10.—The same description treated through the rhinoplastic agency of the oblique incisions and leaden sutures. *aa*, Represents the union of the margins at the median line; *bbbb*, the boundary of the faucial sections; *cccc*, the spaces intervening between the margins and the faucial incisions, with their natural tegumentary coverings; *dddd*, &c. the leaden ligatures twisted at their presenting extremities; *eeee*, the surface of the incised portions of the lips rendered visible after the margins are drawn into contact by twisting the extremities of the wires upon the nasal portions of them, but on their faucial aspects, and is the exact measure of the advantage gained in widening the lips by this mode of operating.

ART. IV. *A new Treatment in a Case of Anchylosis.* By J. RUEA BARTON, M. D.

In the North American Medical and Surgical Journal for April, 1827, I published an account of a new and successful operation at the hip, which had been undertaken for the twofold purpose of remedying a most serious deformity and lameness, and of *establishing an artificial joint*, as a substitute for the natural articulation, which had become obliterated by disease, terminating in true ankylosis.

The principles upon which this operation was founded, as well as the circumstances justifying the performance of it, were fully detailed in the publication at that time.

In prosecuting my views for remedying lameness and deformity from the mal-position of limbs in cases of true ankylosis, I have been enabled to present another case successfully treated, under circumstances suggesting a practice of a peculiar character.

In the case of ankylosis at the hip joint, it is to be recollected that the neck of the femur was sawn through, and the distorted limb straightened. The wound of the soft parts was then healed, whilst the reunion of the divided bone was prevented by subjecting it, from time to time, to motion; such as gentle rotation, flexion, and extension, abduction and adduction. After continuing this treatment for a